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Perfect Surround

Penteo Pro 8

Immersive Audio Up/Downmix Plug-in

Does this major update nudge Penteo ahead of the upmixing pack?

After reviewing Penteo 6 in *SOS* February 2025, it quickly became a permanent feature in my Dolby Atmos mixing template. Its ease of use, features, reasonable price and excellent sound quality made it a no-brainer. If you're unfamiliar with Penteo, it's a plug-in that upmixes and downmixes from stereo to surround sound, catering for everything from Ambisonic arrays to 64-channel immersive formats. They've not rested on their laurels, though: this latest update takes us up to version 8! Rather than repeat myself, I'm going to suggest that if you're unfamiliar with Penteo you should check out my 2025 review, which is free to read on the *SOS* website (https://sosm.ag/perfect-surround-penteo-6), in which you'll find a detailed explanation of the software. Below, I'll focus primarily on the new features in version 8.

Ch-Ch-Changes

The first thing to say is that while there's plenty of change, v8 is backwards compatible with previous versions: if you're already using Penteo, your older sessions will open up in the new version without problem. I should also say up front that I work in Dolby Atmos — that's how I've been using Penteo, and it's the lens through which I'll be reviewing it. But note that Penteo also supports most (if not quite all) multi-channel formats, including Dolby Surround, Dolby Pro Logic, Sony 360, Auro3D and Ambisonics, to name just a handful.

On opening v8, the layout feels familiar. The GUI has been treated to a slicker, more modern look, but everything's in the same place as before, so those who already understand the Penteo workflow will have no problem adjusting. Looking a bit closer, however, there are a few changes and new features, which are worth digging into.

The most obvious change is the provision of a new Lw-Rw fader control, right in the centre of the GUI, which is used when working on multi-channel widths of, say, 9.1.6. Previously, upmixed signals were adjusted using the four centre faders, labelled C (centre), Lss-Rss (left and right surround), Lsr-Rsr (rear surrounds), and Upper (height channels). The benefit of Lw-Rw (left and right wide) is that you can fine-tune your upmix with precision, much more easily. Adjusting these faders determines how much of the input signal is sent to the relevant outputs, of course. Penteo does this by redistributing the energy around the other channels. In other words, pulling back the fader to the left and right surrounds, rather than just reducing the signal in those channels, pushes the signal into the channels around them.

The centre LFE controls also have a new feature: the Synth tab. Opening this tab allows you to turn on the new sub-harmonic generator. Penteo analyses the incoming signal and creates sub-harmonics across three different frequency ranges. The first band analyses between 48-72 Hz and generates sub harmonic frequencies of 24-36 Hz. Band 2 analyses 48-72 Hz and creates harmonics from 36-56 Hz, which can be useful in music for kick drums and so forth, while the third band analyses incoming frequencies between 112-160 Hz, generating sub-harmonics between 56 and 80 Hz. This is a great addition! I found it really useful on an Atmos mix, placed

across a stereo drum stem for which I didn't have access to the individual drum files. Previously, I'd approach this by making a new instance of the drum stem and low-pass filtering that, before routing it to the LFE channel. Or I'd spend a long time trying to isolate the kick from a copy of the stem, so that I could regenerate a new kick drum from samples to send to the LFE channel... You get the idea! The LFE synth tackles this problem much more slickly and effectively, by sending only the regenerated sub frequencies to the LFE. Having the three frequency bands makes it very musical too, since each band can be turned on and off and level adjusted to taste.

The visualiser section has had a refresh too, and now has a 'bi-colour' tab. This allows you to customise the colours of both the bed and height channels, which can translate to a much clearer, more concise visual representation of what's going on. Sonic improvements have been made too, and the DSP has been enhanced — Perfect Surround say this includes better LtRt decoding, a faster response on rapid transitions, and what they call Guaranteed Digital Zero Mapping.



Version 8's new LFE Synth tab — it's a valuable addition.

Decorrelation Suite

Taken together, the above would make this a worthwhile enough update. But the biggest talking point of this new version has to be the new decorrelation suite. When working in immersive audio, sending the exact same signal to multiple channels can cause what's known as the Haas effect. To simplify, the human brain can't make out where the sound is coming from or, if you're not sitting in the 'sweet spot', can determine that it's coming from the speaker closest to you. This is where decorrelation comes in: it's like a 'blurring' of the sound in the surround speakers, which has the effect of the energy being focused in one place. This can also be achieved using chorus effects or delays, but that can often sound unnatural/synthetic so a good upmix plug-in will generally use techniques like diffusion and divergence.

A new feature that's part of this decorrelation suite is the Surround Divergence control, found just below the Lss-Rss fader. Previous versions gave us diffuse controls for the rear surround and upper channels, and those options remain. But the Surround Divergence control takes things to another level, as it affects the whole surround bed. This gives you total freedom to decorrelate the surround channels to taste and focus the sound towards the front of the room. Negative values result in a tighter, more focused signal at the front, whereas positive values start pushing the diffused energy to the surround channels, which adds a sense of depth and ambience.

Perfect Sound
Penteo Pro 8
$499

PROS
- Practical and effective new features.
- Decorrelation Suite is a highlight.
- ...so too is the new LFE Synth!
- Supports a vast range of multi-channel formats.

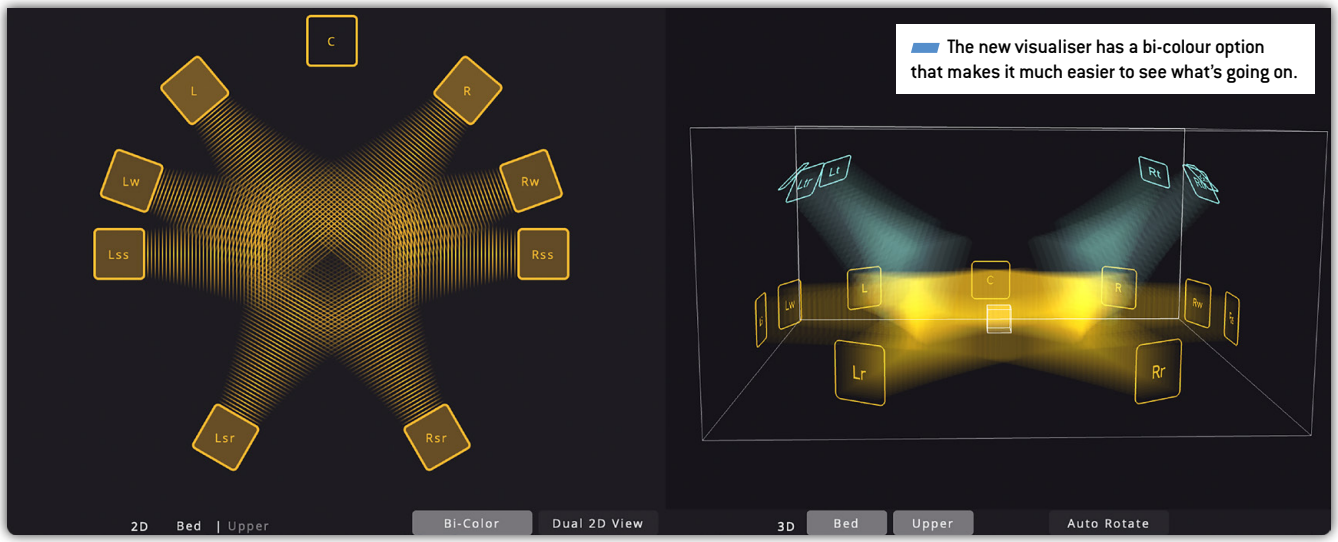
CONS
- None.

SUMMARY
With new decorrelation features and a very handy LFE Synth, this is a superb update that puts Penteo in pole position in the upmixing plug-in market.

The Surround Divergence control works alongside two other options called Vintage and Depth, which are found in the Immersive section of the Settings menu. Essentially, Vintage is what previous versions of this plug-in used, which is useful if you're opening old sessions — in which case it will be the default setting. You can switch to Depth if you'd like more ambient energy in the rears — this one takes advantage of Penteo's new decorrelation algorithm, and is the default setting for new sessions.

> **"Perfect Surround have produced an upmix plug-in like no other, and it sets them apart from their competitors.."**

In previous versions, there was one overall 'upmix mode'. Version 8 allows that to be assigned to any set of outputs, LCR, Lss-Rss, Lsr-Rsr, Lw-Rw, Ltf-Rtf, Lts-Rts, and »



The new visualiser has a bi-colour option that makes it much easier to see what's going on.

» Ltr-Rtr. There are options of Off, Bypass or Passthru, adjustable from just below each channel on the output section. The Off option is the standard upmix mode. Bypass will bypass the upmix in that particular set of channels — and distribute what would have been there around the other channels — while Passthru mode, previously known as 'stem passthrough', will remove the upmix from that output and blend the original signal into those outputs.

Another addition to the Decorrelation suite, found under Settings, determines how the bass frequencies are upmixed. Again, two options are given, Acoustic and Precise. The default is Acoustic, which has a warm bass response, and Perfect Surround suggest using this setting more for orchestral music, film scores or live recordings. Precise, as you'd imagine, delivers a tighter, punchier, more controlled sound, and it's perfect for modern-sounding pop and rock.

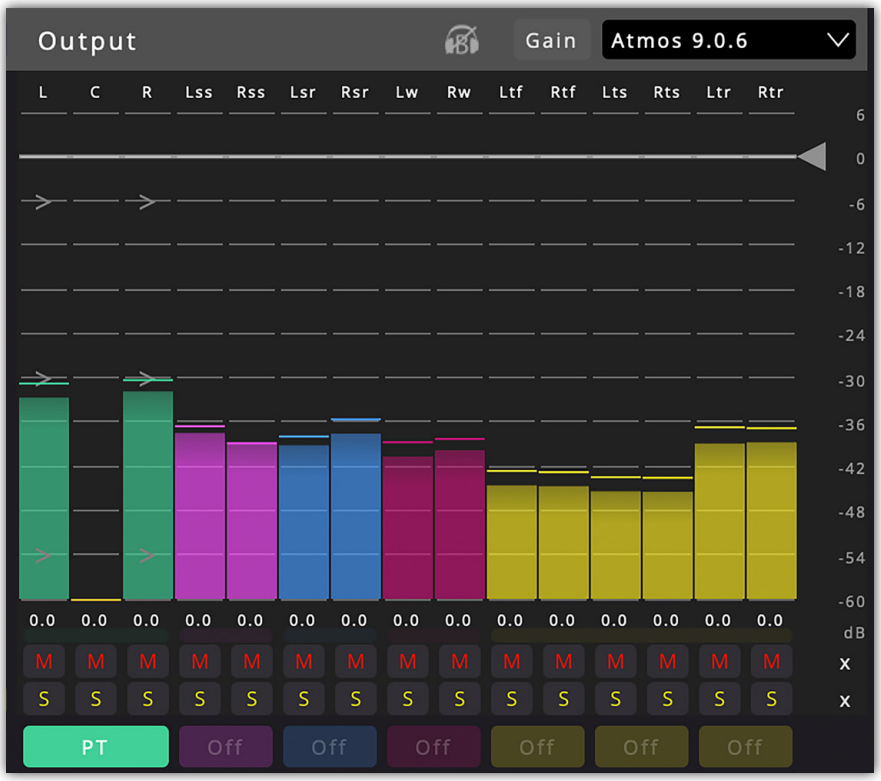
Despite all of the new options in terms of diffusion, divergence, bass and channel upmix modes, not to mention LFE enhancement, Perfect Surround claim that Penteo still delivers 100 percent bit-exact ITU downmix compatibility — and if in doubt, you can keep an eye on the Downmix indicator at the top right of the GUI.

Final Thoughts

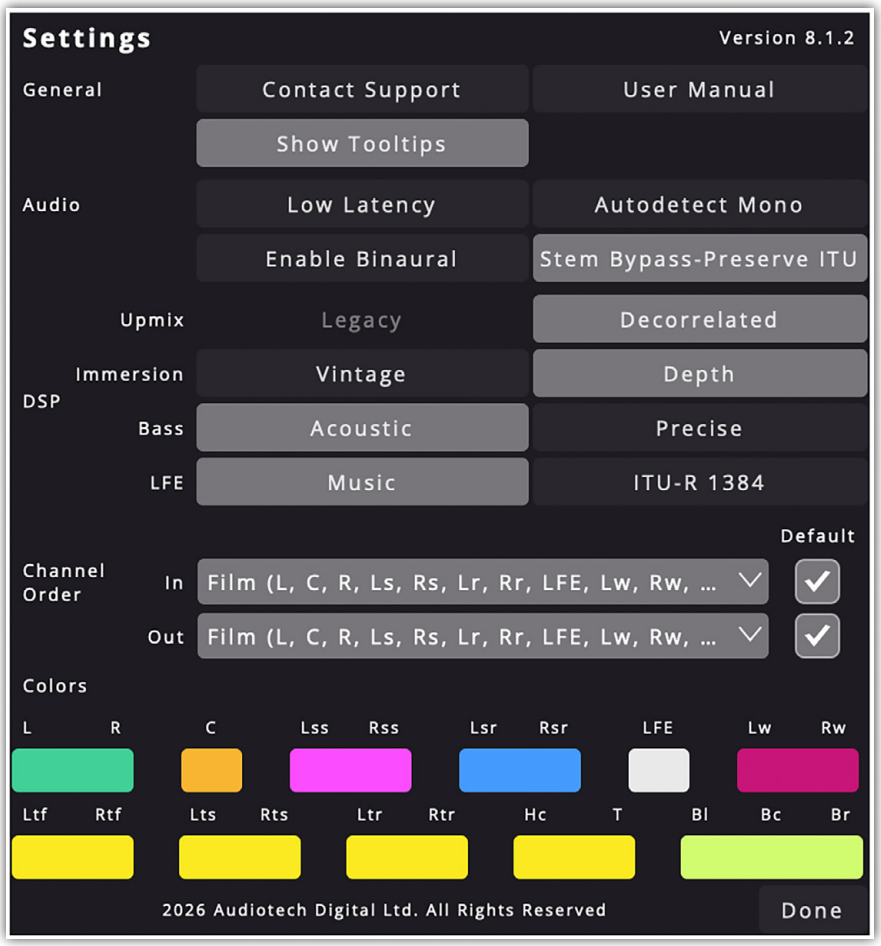
In my previous Penteo review, I compared the plug-in with Nugen Audio's Halo. At that time, I concluded that both plug-ins had considerable merit, and that I couldn't honestly recommend one over the other. Well, Penteo 8 has changed that! Perfect Surround have produced an upmix plug-in like no other, and it sets them apart from their competitors. It's simple to use as soon as it's been installed, and it's a great-sounding plug-in too. But what really takes it to new heights is the Decorrelation Suite, and the various new options found under its hood. You can dig into the detail as much you want but, importantly, you don't have to. And, when you realise it's needed, you'll also find that the new LFE Synth is a genius addition!

If you're already a Penteo user, the great news is that this is a free update for you. But the full price isn't unreasonable, given the intended market, and Perfect Surround offer a 14-day free trial should you wish to evaluate it before buying. ■■■

£ Penteo 360 $299. Penteo Pro $499. Penteo Pro+ $799.
W www.perfectsurround.com



The output section, showing the upmix mode selection.



The Decorrelation Suite extends the effectiveness of Penteo considerably, and includes various new features.

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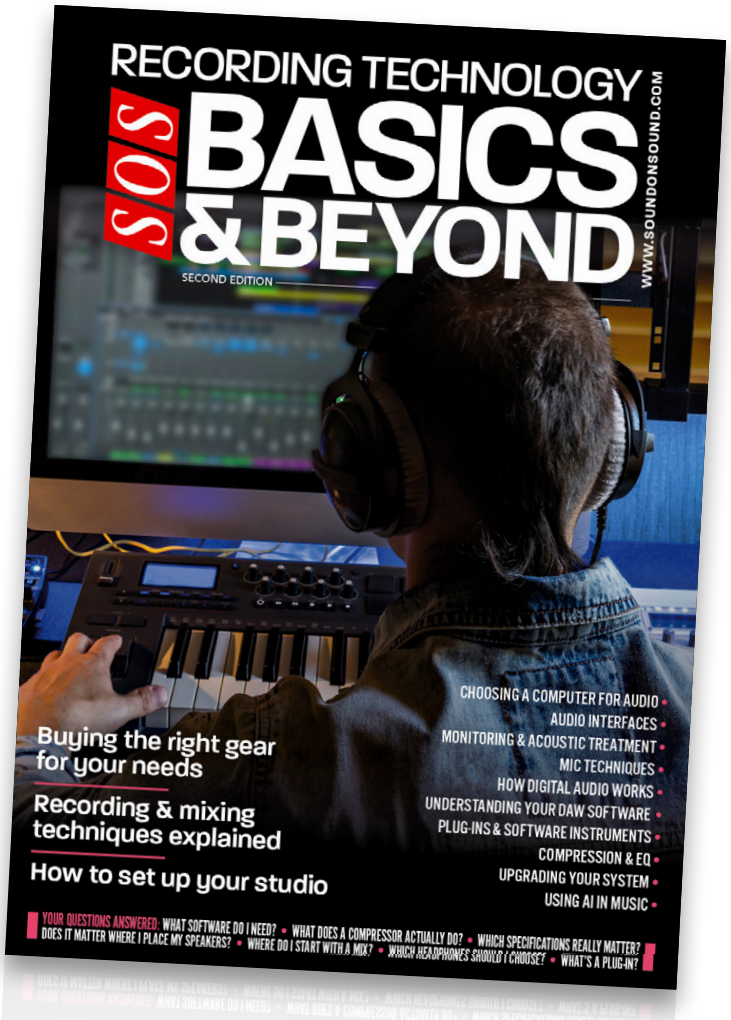

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